

Design and manufacture of novel food structures for the targeted delivery of bioactive components to the large intestine

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Colonic delivered hydrocolloids may act as chemopreventive agents and/or also as prebiotics. However, in order to formulate foods that provide such benefit to consumers there is a need to design and manufacture novel "food-grade" delivery structures, using particulates small enough to remain "undetected" in the mouth upon consumption engineered to be delivered to the appropriate part of the GI tract.

This presents a range of "food engineering" challenges that can only be addressed by the cutting edge research ([Fotis Spyropoulos \(/staff/profiles/chemical-engineering/spyropoulos-fotios.aspx\)](#) (PI); Chemical Engineering). In addition, although there is evidence on the beneficial effect of delivering alginate to the colon, the possibility of using other hydrocolloids, of similar or superior iron-binding potential, has not yet been explored. Through the hydrocolloid screening program proposed in this project we aim to explore this further ([Chris Tselepis \(/staff/profiles/cancer/tselepis-chris.aspx\)](#) (CI); Cancer Sciences). What is more this project aims to study these hydrocolloids (including alginate) for their potential to act as prebiotics.

This project could potentially be the precursor for a new generation of foods that do not just provide a pleasurable eating experience but also deliver health benefits currently only associated with drugs. Therefore there is a need to determine consumer acceptability of such foods and the ethical implications of presenting information about their "functions" to consumers. These issues will be explored by [Jackie Blissett \(/staff/profiles/psychology/blissett-jackie.aspx\)](#) (CI) (Psychology), [Heather Draper \(/staff/profiles/haps/PrimaryCareClinicalSciences/draper-heather.aspx\)](#) (CI) (Health and Population Sciences) and Hala Evans (CI) (Sportex).

This multidisciplinary approach has the ultimate aim that any attempt to bring to the public foods that deliver significant health benefits is:

- informed by consumer attitude and opinion regarding the acceptability of the potential product for purchase and consumption at the outset, and
- anticipates ethical ambivalence about the levels of information that best facilitate positive attitudes and willingness to try the novel products.

This project will run from January to June 2012.

Summary of Research Results for Participants...

The overall aim of this research was to explore consumer acceptability of a hypothetical everyday product containing an active ingredient that could prevent bowel cancer. Four focus groups of women between 50-70 years were convened. Only two of these were told what the active ingredient added to the yogurts was (an iron chelator which removes excess iron from the bowel). This was to enable us to explore to extent to which describing the process by which bowel cancer may be prevented altered perceptions about the product to which it had been added. A short summary of the research results can be found below. Once again, thank you very much for participating in our research.

Participant perceptions of foods labelled as healthy

The participants in our focus groups were:

- Very sceptical of whether food labelled as 'healthy' was actually healthier than other similar foods.
- Unsure how 'healthy' should be defined.
- Felt labels needed to be read carefully as food marketed as healthy often included hidden unhealthy ingredients (e.g. product may include less fat but more sugar than the standard alternative).
- Predicted that healthy foods would taste worse than 'unhealthy' foods.
- Believed that the healthiest foods were unprocessed.

Participant interest in foods labelled as healthy

- Increased as participants grew older.
- Was associated with weight loss and attempts to lose weight.
- Increased if the product claimed to prevent a condition which they thought they were at high risk of developing.
- Some participants indicated that they had no interest in such foods.

Incentives to purchase the product

- Special offers were a big incentive to purchase.
- There were mixed responses about participants' willingness to pay more for foods labelled as 'healthy'.
- Whether participants thought the product would taste nice, and whether they thought they would enjoy it, was likely to decisions to purchase.

Bowel cancer knowledge

- Knowledge was gained from a variety of sources e.g. personal experience, word of mouth and public health campaigns (which include bowel cancer testing kits, television/radio advertising).
- Participants associated genetics, increased age, male gender and lifestyle factors (e.g. smoking, poor diet) with an increased likelihood of developing bowel cancer.
- Participants recognised the importance of early diagnosis for improved prognosis and the embarrassment associated with consulting a doctor.

Participants' thoughts about putting additives in food to prevent bowel cancer

- Participants were more reluctant to consume food that had been 'interfered with'/'doctored', especially if they felt that the additional ingredient was 'artificial' or 'chemical' rather than 'natural'.
- 'Natural' ingredients were preferred or considered healthier.
- Some worried about the loss of individual choice if an iron chelator was added to staple food products (as a result of government intervention).
- Others thought that if there were benefits, this would justify the government putting them into staple foods.
- Participants in the groups that knew how the product worked (removing excess iron), were more worried about losing useful iron. As a result, these participants were less likely to purchase the product or recommend it to others.

A need for Research

- Participants were very suspicious of the product's ability to decrease the incidence of bowel cancer or to rid the body of excess iron, especially of how these claims related to them *personally*.
 - o They thought that much more research was required to verify the manufacturer's claims
 - o But, some would be more inclined to trust of claims supported by a GP or the NHS.
- Participants also wanted to reassured about dosages and potential side effects, especially for children.

Once again, thank you very much for participating in our research.

If you who are interested to know more about bowel cancer, or want to test your knowledge, the following link will take you to some further information:

http://publications.cancerresearchuk.org/downloads/product/CRUK_AL_BOWEL_0211_PaulDaisleyTrust.pdf
(http://publications.cancerresearchuk.org/downloads/product/CRUK_AL_BOWEL_0211_PaulDaisleyTrust.pdf)

If you are worried about bowel cancer, the following link may be of use:

<http://www.beatingbowelcancer.org/what-bowel-cancergclid=CKWg3re7p7ACFU4IfAodrxCGXw> (<http://www.beatingbowelcancer.org/what-bowel-cancergclid=CKWg3re7p7ACFU4IfAodrxCGXw>)

If you have any further questions please contact Dr Jackie Blissett (j.blissett@bham.ac.uk (<mailto:j.blissett@bham.ac.uk>)) or Professor Heather Draper (h.draper@bham.ac.uk (<mailto:h.draper@bham.ac.uk>)).

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